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Starch and the *Alphabet of Galen**

El almidón y el *Alphabetum Galieni*

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Ancient cooks (like 'Apicius') were familiar with starch as a thickening agent for sauces and for use in pastries; it was also employed to stiffen textiles, as it occasionally still is, and it had many other uses. Starch can be produced from a variety of plants, but in Antiquity its chief source was wheat (*triticum*, *frumentum*, or *siligo*, *ρυπός*). The best starting point for this survey of recipes for starch-making from Antiquity through the Middle Ages is Ch. 6 of the *Alphabet of Galen* (Galen. *alfab.*), a Latin pharmaceutical work from Late Antiquity based on Greek sources; as we shall see, the *Alphabet* was excerpted fairly often and thus occurs in a number of well-known and less well-known works often with an

* I have profited greatly from the remarks of the anonymous reviewers for the journal, one of whom pointed out that Serapion was the Latin translation of Ibn Wafid's book on simple drugs (see the excursus at the end of the article). Francis Cairns, Professor of Classics at Florida State University in Tallahassee, Florida, sorted out my English. Flaws and errors that remain are my sole responsibility. To them all I owe a debt of sincere gratitude. The article was written as part of a project directed by María Teresa Santamaría Hernández, Universidad de Castilla-La Mancha at Albacete, funded by the Ministerio Español de Economía y Competitividad (FFI2013-42904-P).

encyclopedical character. Ch. 6 reads as follows in the first critical edition by Nicholas Everett:¹

I 6) Amylum

Amylum omnibus notum est, enim quasi medulla frumenti quod infunditur [et tunditur donec furfurem suam demittat. Deinde cum aqua mittitur] in sportellam et cum pressura colatur et tunc cum minimo ipse nucleus uelut fex desidat aqua effusa in sole siccatur et amyllum [line 5 Everett] cognominatur.

Cuius est optimum quidem recentissimum et candidum et leue et sine ullo acrore uel lutoso aliquo aut inquinoso odore.

Potest autem leniter stringere propter quod collyriis ad lachrymam facientibus miscetur et ad profluuium uentris prodesse comprobatur.

I propose instead the following text:

6.1 Amylum omnibus notum est. Est enim quasi medulla frumenti, quod infunditur et tunditur donec furfurem suam dimittat. Deinde cum aqua mittitur in sportella et cum pressura percolatur et tunc cum in imo ipse nucleus uelut faex desederit, aqua effusa in sole siccatur et amyllum cognominatur.

6.2 Cuius est optimum quod est recentissimum et candidum et leue sine ullo acrore uel situoso aliquo aut inquinoso odore.

6.3 Potest autem leniter stringere, propter quod collyriis ad lacrimum facientibus miscetur et ad profluuium uentris prodesse comprobatur.

My text is based on a fresh examination of the mss. used by Everett, along with:

O: Pseudo-Oribasius as printed in the *Physica S. Hildegardis* of 1533
E: MS. Edinburgh, National Library of Scotland, Adv. 18.5.16, s. 12, fol. 79^r-91^v

¹ Nicholas Everett, *The Alphabet of Galen: pharmacy from Antiquity to the Middle Ages*. A critical edition of the Latin text with English translation and commentary, Toronto etc., Toronto University Press, 2012, pp. 148-149.

R: The herbal of Rufinus (Florence, Biblioteca Medicea-Laurenziana, Ashburnham 116, s. 14 (ed. Thorndike²))

The table below compares my apparatus with that of Everett p. 148, in which his line numbers are retained. Everett p. 119 makes his procedure clear: “The recording of variants has been restricted to those which reflect a different, yet still sensible meaning, and particular care has been taken to record omissions (*om.*), important for determining the manuscript traditions mentioned”. The sigla employed are, apart from the new witnesses listed above and **ed.** (the 1490 edition of Galen. *alfab.*), identical with those of Everett.

Fischer	Everett
6.1 amyllum] VI amolum V VI amilos F cap. .vi. de Amilo. Amilum ed. cap. VI. De Amylo Amyllum est O amilum est E amilum LMM₂BCPW ed. amilum conueniens medicaminibus est W	1 Amyllum] amolum V amilos F amilum BPM amilum conueniens medicaminibus est sit enim ex medulla fructi W
omnibus notum (nutum V) est] est omnibus notum E omnibus est notum BP omnibus notum M₂ om. MW	omnibus-notum] <i>om.</i> M nomine C
est ²] fit W	
quasi] <i>om.</i> CWR	quasi] <i>om.</i> C
medulla] medullam V ex medulla W	
frumentij] fromenti V	
quod] qui ed.	
	2 infunditur] conditur L'B
et tunditur] <i>om.</i> VC ed. R	infunditur-mittitur] <i>om.</i> VJ
donec] quousque BP	

² *The Herbal of Rufinus*. Edited from the Unique Manuscript by Lynn Thorndike, assisted by Francis S. Benjamin, Jr., Chicago, University of Chicago Press, second impression 1949 (first edition 1946). The entry on *amilum* is on pp. 20f. The text from Galen. *alfab.* is attributed here and in other places in this herbal to ‘Dyascorides.’

* infunditur according to José Manuel Cañas Reillo, in: *Herbolarium et materia medica* (ms. 296). Libro de estudios. Ensayos de ... Transcripción y traducción del texto del manuscrito por J. M. C. R., s. 1., AyN Ediciones, 2007, p. 275.

Fischer	Everett
furfurem suam] f. suum MR furforis suum M₂ furfur suum WO furfurem sum(!) E forfures suas V furfurem C	
dimittat] demittat VF amittat BP om. ed.	
deinde–cognominatur <i>om. C</i>	
deinde] exinde BP ibi <i>ed.</i>	
cum aqua] aqua M₂ om. BP ed.	
mittitur in sportella] in sportola mittitur V m. in sportula ER m. in sportellam M₂ sportellam <i>ed.</i> m. in sportellas O m. in patella BP	3 sportellam] patella <i>P</i> pressura <i>W</i>
cum pressura] cum persura L compressa BP	pressura] pressa <i>BP</i> percolatur <i>L</i>
percolatur] perculcatur F (<i>an recte?</i>) colatur VBPWE ed. R	
tunc cum] tunc MO eum E cum R	et tunc–cognominatur] <i>om. JC</i>
in imo] in himo F in imo uasis ER in vno <i>ed.</i> minimo V in iniimo W	cum minimo] in himo <i>F</i>
ipse nucleus (noceus MM₂)] <i>om. WOR</i>	
uelut–amylum <i>om. ed.</i>	
uelut (uelux M) faex] ueluti B om. P	4 uelut fex] <i>om. P</i>
desidet] desedit V resedit MM₂ residerit (resed- PEWR) BPEWR descendens O	desidet] resederit <i>PW</i> resedit <i>M</i>
aqua effusa (efusa L)] aquam effusa E aqua (acua M₂) infusa VM₂ WO aqua infusam M aquam fusa F aqua fusa R	
in sole] in solem M in sale V ad solem W	in sole] in sale <i>V</i>
siccatur] desiccatur V siccare MM₂	
et–cognominatur <i>om. ER</i>	
et ⁴ <i>om. MM₂W</i>	
amylum] amilo M₂ amillo V amulum B ammolum F	
cognominatur] cumnominatur V cognominant M comminant M₂ nominatur <i>ed.</i>	

Fischer	Everett
6.2 cuius–odore <i>om.</i> CER	
est ¹ <i>om.</i> M	
quod est recentissimum] quod recentis F quidem recentissimum ed.	5 quidem] quod est <i>LB</i>
candidum] candidissimum BP	
leue] leuem VMM₂	
sine] et sine BP ed.	
ullo acrore] ullum a. V ullo acore O ulla acredine P	
uel–odore <i>om.</i> PW	6 uel–odore] <i>om.</i> WP
situoso <i>scripsi</i>] situ L situoso ed. sicusa F si tursum M₂ si tunsum fuerit M lutoso B sine VO	lutoso] ut situ sit <i>L</i> sicusa <i>F</i> ut lutoso <i>B</i> autem amulum <i>C</i>
aut] <i>om.</i> VO habet aliquod M	
inquinoso odore] inquinatum odorem MM₂ inquinatu mali odorem V	
6.3 autem] autem amulum C om. P	
leniter] leuiter W linitum V	
stringere] extingere V stringi M	
collyriis] collyrias V collirium M caluijs ed.	
ad lacrimum] a lacrimum V ut lacrimum M₂ ad lacrimam FL ed. ad lacrimas BCP lacrimas WER	
facientibus] stringentibus WER	
miscetur–uentris <i>om.</i> B	8 miscetur–comprobatur] <i>om.</i> <i>LBC</i>
miscetur] misceatur V nisetur M₂	miscetur] optime prodest <i>B</i>
et <i>om.</i> FP	
ad] a C om. M	
profluuium uentris] p. uentres V p. ueteris C uentris profluuium WER	
prodesse comprobatur] p. probatur O prodest et probatur M₂ probatum est M optime prodest BP ualde prodest WER	prodesse comprobatur (<i>sic!</i>)] optime prodest <i>P</i>
	comprobatur] <i>om.</i> <i>M</i>

Other ancient accounts of the preparation of *amylum*

It will be useful at this point to review other authors' accounts of *amylum*. The oldest (2nd half of 4th c. BC) is Dieuches fr. 16 Bertier,³ preserved at Oribasius, *coll. med.* 4.8:

II Preparation of *amylon* and other products resulting from sedimentation

4.8.1 Sedimentation products like starch (ἄμύλιον) can be made from all pulses. Starch is made like this: Take the finest wheaten flour,⁴ moisten it lightly and wash it and strain it through a piece of linen with the maximum amount of water and rid it of most of its sticky parts. Afterwards let it settle in an earthenware vessel, throw the water away and pour on more water in the same way and repeat until the water you strain off becomes clear; after this, take what has settled on the bottom and put it in the sun in an earthenware vessel until it is completely dry.

The next is Cato *De agricultura* 87; ⁵ he calls starch *amulum*, which reveals that his information came from a Greek source:

III Preparation of *amulum*: clean wheat (*siligo*) well, then put it into a trough and pour on water twice a day. On day 10, get rid of the water and squeeze out the moisture well and mix it in a clean trough so that you get a kind of sediment. Put this into a new piece of linen, press out the sticky liquid into a new vessel or into a mortar; do all this in this way and work it again. Put this vessel in the sun so that it dries. Once it is dry, put it into a new pot and boil it with milk.⁶

³ Janine Bertier, *Mnésithée et Dieuchès. Fragments*, Leiden, Brill, 1972, 248-253. There are no additional notes on this passage in *Œuvres d'Oribase*, texte grec ... traduit pour la première fois en français; par les docteurs Bussemaker et Daremberg, tome premier, Paris 1851 (Greek text and French translation pp. 294-295).

⁴ This can hardly be called one of the pulses (ὄσπρια) mentioned at the beginning of the chapter.

⁵ See Werner Suerbaum, in: *Die archaische Literatur. Von den Anfängen bis Sulla's Tod*, ed. Werner Suerbaum, München, Beck, 2002 (Handbuch der lateinischen Literatur der Antike. 1), pp. 400-409 (French edition Turnhout, Brepols, 2014 as *Nouvelle histoire de la littérature latine. La littérature de l'époque archaïque: des origines à la mort de Sylla*).

⁶ Diosc. *mat. med.* 2.101.2 μείγνεται δὲ καὶ γάλακτι καὶ προσεψημασι.

Next is Dioscorides *mat. med.* 2.101.1 (Lat. p. 212 Stadler):⁷

IV ἄμυλον⁸ gets its name from being prepared without a mill.⁹ The best kind is made from spring-wheat (ἐκ πυροῦ σπηταίου), from Crete or from Egypt. It is prepared from cleaned spring-wheat that has been moistened and washed with drinking water; this (water) is changed five times a day, and if possible, also during the night. When it gets soft, pour off the water gently without moving the grain, avoiding throwing away the valuable portion at the same time. When it has become quite soft, throw away the water and crush it with your feet (hands, in the Latin translation), then pour on more water and crush it again. Then you must remove the hulls floating on top with a sieve and pour the rest into a colander, let the water run away and spread it at once on tiles that have not been used before in the hottest sun, because if it remain moist even for a short while, it turns sour.

V Plin. *nat.* 18.76-77¹⁰ was aware of Cato's account (*iam et Cato dictum apud nos*) and adds a few details: *ex omni tritico ac siligine, sed optimum e trimestri*, which I take to be equivalent with

⁷ Greek: *Pedanii Dioscuridis Anazarbei de materia medica libri quinque*, ed. Max Wellmann, vol. 1, ed. altera ex editione anni MCMVII lucis ope expressa, Bero-
lini apud Weidmannos, 1958 (online: <<http://cmg.bbaw.de/epubl/online/publi-weitereausgaben.html>>); Latin: "Dioscorides Longobardus (Cod. Lat. Monacensis 337). Aus T. M. Aurachers Nachlass herausgegeben und ergänzt von Hermann Stadler", *Romanische Forschungen* 10 (1899), pp. 181-247. The English translation is by Lily Y. Beck, *Pedanius Dioscorides of Anazarbus, De materia medica*, second, revised and enlarged edition, Hildesheim etc., Olms, 2011, p. 134, preface by John Scarborough, who helped the author, as did John M. Riddle, author of the review of the first edition (2005) in *Medical History* 50 (2006), pp. 553-554. For notes and explanations (sparse in Beck), see Julius Berendes, *Des Pedanios Dioskurides Arzneimittellehre in fünf Büchern*, Stuttgart, Enke, 1902; note that he used Sprengel's edition (*Pedanii Dioscoridis Anazarbei de materia medica libri quinque*. ... recensuit ... Curtius Sprengel, Lipsiae, Car. Knoblochius, 1829) where the numbering of chapters occasionally differs. Berendes was a pharmacologist who knew Greek. See further John Scarborough's essay review of Beck and Aufmesser "Dioscorides of Anazarbus for Moderns", *Pharmacy in History* 49 (2007), pp. 76-80.

⁸ Cf. Manuela García Valdés, *Dioscórides. Plantas y remedios medicinales (De materia medica)*. Libros I-III, Madrid, Gredos, 1998 (Biblioteca Clásica Gredos 253).

⁹ Dioscorides used the later form μύλον, not the μύλη of classical Greek.

¹⁰ 18.17 on Everett p. 149 is, I suspect, a printing error (unless chapter 16 in Pliny was meant). For Pliny 18.76 (*ibidem*, p. 148), read 18.76-77 (also used in Vincent. Bellovac. *spec. nat.* 11.55, see below, who continues with Plin. *nat.* 22.137). To the parallels cited there, add Gal. *simpl. med.* 8.42 (12.111 Kühn).

Dioscorides' ἐκ πυροῦ σπτανίου, i.e. ripening in three months and therefore the variety sown in spring. The grains are steeped in wooden tubs (*ligneis uasis*); like Dioscorides, Pliny advises changing the water five times during the day and if possible also during the night. Many have wondered why, even though they were more or less contemporaries, Pliny does not cite Dioscorides although he draws on numerous other authors and mentions them explicitly; here (as elsewhere), it seems best to assume that both used the same or at least similar sources. Pliny mentions two ways for getting rid of the water left in the mass before putting it out to dry in the sun, *linteo aut sportis* (*sportella* in Galen. *alfab.*) 'linen cloth or wicker baskets'; this again must reflect methods in current use, and while the use of linen occurs more often in our sources, Galen. *alfab.* refers only to the wicker baskets. Pliny alone specifies that the tiles used for drying should be *inlitae fermento* ('smeared with leaven', H. Rackam, Loeb¹¹); this would, I surmise, make it easier to remove the finished product when it has dried completely.

Dioscorides was copied (or perhaps adapted) by VI Paul of Aegina (7.3. p. 193, 18-23 Heiberg); he says that the process should take place during the dog-days, at the height of summer, a detail I have not seen in any other source.¹²

The last text comes from a mid-12th-century ms., Paris, BNF, lat. 16944, fol. 87^{va}, and is part of Galen's *Liber dinamidorum id est uirtutum scriptum ad mecenam suum dilectum*; since Galen was

¹¹ Fritz Fleischmann, active in a Nuremberg baker's shop in his early youth, informs me that sourdough (ζύμη) is meant.

¹² Franz Olck, s.v. ἄμυλον, *RE* I.2, Stuttgart 1894, 2011-2002 (also at <<http://de.wikisource.org/wiki/RE:Άμυλον>>), is still useful (although he quotes, for the preparation on *amylon*, only Cato, Pliny and Dioscorides). It seems surprising that neither *Der kleine Pauly* nor *Der neue Pauly* have an entry, and the one in *Lexikon der Alten Welt*, Zürich/München, Artemis Verlag, 1965, 2901 (by Werner Krenkel) s.v. Stärkemehl, is short, lacking in precision, and cites no Greek sources; Krenkel was a Latinist, after all. It is perhaps even more surprising that J.-Y. Guillaumin, in his edition, translation and commentary of *Isidore de Séville. Étymologies*. Livre XX, Paris, Les Belles Lettres, 2010, refers, for *Isid. orig.* 20.2.19 Lindsay = 20.1.22 Guillaumin, to Daremberg-Saglio s.v. *cibaria* (a short paraphrase of Plin. *nat.* 18.76-77), and to Jacques André, *L'alimentation et la cuisine à Rome*, nouv. éd. Paris, Les Belles Lettres, 1981, 57. (Guillaumin seems to cite the first edition, Paris, Les Belles Lettres, 1961).

born more than a hundred years after Maecenas' death (in 8 B.C.), the work has nothing to do with either of them.¹³

VII Amilum sic facis.

Mittis frumentum mundum in aqua per noctes et dies III. per singulos dies mutabis aquam. postea in pila machinabis¹⁴ (macerabis *trad.*) et addis aquam et per linteolum mundum bene extorquens mittis in concam. et uide ut bene purgetur aqua. Aquam desuper mitte. et ipsam aquam diligenter expurga. ut fundum non moueas.' et quod remanserit ad solem siccabis. et reponatur. id est amilum.

Place clean wheat for three days and nights in water, changing the water every day. Afterwards you grind it in a mortar, pass it through a clean linen cloth and put it into a vessel and make sure that the water is cleaned well. Pour on water and clean this water well, without moving (what is at) the bottom. What is left you dry in the sun and store; this is *amylum*.

The early 9th-century ms. Sang. 759, p. 14, perhaps from Brittany, seems to be so close that one might hypothesise a connection:

VIII CLXII Conf. amili

elegis triticum albucium et diligenter purgabis et [a]molas semel uel secund. fracta infundis in aqua die I. et nocte et alia die manibus fortius confricabis in ipsa aqua ut in sucu<m> reuertatur et liquabis ipsum sucum per lentiolum mundum in uas latum et equalem et sines ut resedeat et aqua que supernatauerit subtiliter

¹³ These (pseudo-Galenic) *Dynamidia* were last printed by Chartier in vol. 10, 670-702. The letter to Maecenas is also transmitted among Galenic works in Madrid, Biblioteca nacional, 2223, s. 14, fol. 44^{rb}-45^{ra} '*Explicit epla. g. ad mecenatem.*'

¹⁴ Cf. *ThlL* s.v. *machinor* II, explained as 'i.q. molam machinariam versare'; the article (by Hermann Dietzfelbinger) refers to J. Svennung, *Wortstudien zu den spätlateinischen Oribasiusrezensionen*, Uppsala, A.-B. Lundquistska Bokhandeln, 1933 (Uppsala Universitets Årsskrift. Filosofi, spåkvettenskap och historiska vetenskafer. 5), p. 94; Svennung himself directs the reader further to p. 116, where he discusses *remac(c)inare*, *Orib. syn.* 3.79 p. 867,19 Molinier, saying 'Hier scheint also die Bed. '(immer)wieder schwingen' vorzuliegen; doch kann auch eine freie Übersetzung vorliegen und 'mahlen' vom Übersetzer gemeint sein; ...', which is how Arnaldi interprets it ('conterere'), as I do. Svennung cites πολλάκις πάλλιν (? – his questionmark), Raeder follows, correctly as I think, the reading of *Orib. coll. med.*, πάλιν, so there is no question of 'schwingen'.

leuabis causius ne se de himo moueatur (*meu-* trad.) et sucu suo coaculatum in sole siccabis tempore caniculare †retaxat quietum† et seruabis.

Preparation of starch (*amylum*)

You take white wheat and clean it carefully and grind it once or twice. You steep the roughly ground wheat in water for one day and one night and on the next day you crush it sufficiently firmly with your hands in the same water so that it turns into an opaque liquid. This you filter through a clean linen cloth into a wide dish with an even bottom and let it settle there. You take off the water on top with care and caution so that (the mass) is not stirred from the bottom. When the liquid has become thick you let it dry in the sun during the hottest time of the year † ... † and store it.

To sum up: The important steps are (a) macerating or steeping the grain (for up to ten days), (b) breaking up the hulls, (c) removing them, (d) removing the non-starchy parts by changing the water frequently, (e) removing as much moisture as possible from the mass (with the help of a linen cloth or wickerwork [only in **I** and **V**]) before (f) drying it in the sun.

A closer look at Galen. *alfab.* 6

We can now return to our starting-point, Galen *alfab.* 6. Everett thought that *et tunditur – aqua mittitur* did not belong, although crushing is mentioned in Dioscorides **IV** (quoted by Everett); however, I cannot myself say why it is missing from Pliny **V**. The removal of the outer layer of the grain (hull, husk, bran, Latin *furfur*) is likewise found in Dioscorides but not in Pliny. Galen *alfab.* 6 says only that ‘it is pounded until it sheds its hull’, but nothing about the hulls floating on top so that they can be removed with a sieve (ἀναιρεῖσθαι τὸ ἐπιστάμενον πίτυρον ἢ θμῶ in Dioscorides). The next stage is to get rid of any water left in the remaining mass, either by wringing it in a linen cloth, or by pouring it into a wicker basket (most likely conical or funnel-shaped) and applying pressure (*cum pressura*). At its bottom (*in imo*), some material will settle, i.e. *ipse nucleus*; should we understand *grani* or *frumenti* and see it as synonymous with *medulla frumenti*, or think of the mass that has been produced so far? Be that as it may, it settles at the bottom the way dregs do, *uelut faex*. This is how *fécula*, *fècola*, *fécule* came to mean starch!

The other Romance word for starch¹⁵ derives directly from *amylum*, but the common forms all have a d instead of an l: almidón (Spanish), àmido (Italian), amidon (French). Should we think of a change from *amilum* to *amidum* in Late Antiquity, i.e. in vulgar Latin? This seems to be the opinion of the editor of the *Alphita*, Alejandro García González;¹⁶ the entry there is

(A75) Amidum,¹⁷ amilus idem; quod interpretatur sine mola fractum,¹⁸ et fit de tritico

I believe that the form with d originated in the Middle Ages; this is also the view of Marinucci s.v. *amylum* in *Lessico Etimologico Italiano* (Wiesbaden 1987) II.1030-1031, who refers to *FEW* 24, 511 (Chambon): “devenu *amidum* en mlt., vraisemblablement sous l’influence de la série des mots en -*īdum*”; see further Marinucci’s bibliography.

The definition of *amylum* as *medulla frumenti*, introduced in most mss. with *quasi* ‘sort of’, has not been met with in the other sources that describe *amylum*,¹⁹ with the exception of the (unidentified) Magister Salernus.²⁰ And yet we find it again in a very strange place, a book of technical recipes called *Mappae clavicula* said by the *Mittelaltinisches Wörterbuch* s.v. *amylum* (Gerhard Baader) to come from the second half of the 8th century — a reasonable assumption since the *Mappae clavicula* was first men-

¹⁵ For details, see *FEW* (2nd ed.) s.v. *amylum*.

¹⁶ *Alphita*. Edición crítica y comentario, Firenze, SISMEL Edizioni del Galluzzo, 2007 (Edizione Nazionale «La Scuola Medica Salernitana» 2); he dates (p. 49) the glossary to the first half of the 13th century. The oscillation between l and d is also found in *La sinonima delos nonbres delas medeçinas griegos e latynos e arauigos*. Estudio y edición crítica de Guido Mensching, Madrid, Arco Libros, S. L., 1994, a glossary from the late 14th century.

¹⁷ Krafftmeel/ Ammelmeel/ Ammelung/ Stärckmeel/ Amydum, Amylum in Adam Lonicer (Lonitzer), *Kreuterbuch ... Nunmehr durch Petrum Uffenbachium ... auf das allerfleissigste übersehen ...*, Ulm, 1679, p. 523.

¹⁸ I prefer to read *factum*, with U; quite a number of mss. omit the word altogether.

¹⁹ Nevertheless, in Zedler’s *Encyclopaedia* (Johann Heinrich Zedlers [publisher], *Grosses vollständiges Universal-Lexicon aller Wissenschaften und Künste*, 1731) s.v. *Amylum*, he uses ‘Marck’, a German word for *medulla*.

²⁰ I quote from Rufinus, p. 21: (*amilum*) *frigidum est in primo gradu, quamuis sit medulla frumenti quod est calidum. Contrahit enim ex aqua proprietatem infrigidandi ac ponitur in unguentis frigidis*. = Salvatore de Renzi, *Collectio Salernitana*, vol. 5, Napoli, 1859, 310 (Commentarium Magistri Bernardi Provincialis super Tabulas Salerni).

tioned in the catalogue of 821/822 of the Reichenau monastery (Augia Dives). Thorndike²¹ described it in a chapter dealing with works from the early Middle Ages, but I have not seen arguments that would exclude Late Antiquity as the date of composition. *medulla frumenti* is an expression known from Pliny (Plin. nat. 18.87; 18.112) and used e.g. by Hieronymus in the Latin bible (Vulg. deut. 32,14 *medulla tritici*) and again later (Hier. tract. in psalm. I p. 301, 20 *granum frumenti ... medullam habet*) in the same way as in Galen. *alfab*.

282. Amidum medulla est de frumento media libra. mixta in aqua cal. .v. unc. et mediam de uitro safiro et aquam quantum sufficit.

282. Starch paste²²

Starch paste is half a pound of wheat kernel with mixed hot water, and 5½ ounces of glass sapphire and sufficient water.

Since starch is not intrinsically important for the technical recipes in the *Mappae clavicula*, I suspect that this section, like some others preceding it and some more coming after (e.g. the table of runes) were not part of the original *Mappae clavicula* but added later. The other recipes for making starch reveal that it does not require glass sapphire (Smith and Hawthorne remarked on this oddity in their n. 194); and most of the steps in the preparation of starch are missing from this recipe. *safiro* is puzzling and may mean the same as *sapphiricus* 'sapphire-blue', whereas I would emend *uitro* to *nitro*.²³ *nitrum*, by softening the water, would in my

²¹ Lynn Thorndike, *A history of magic and experimental science during the first thirteen centuries of our era*, vol. 1, New York, 1923, pp. 765-770. C. S. Smith, J. G. Hawthorne, *Mappae Clavicula*, Transactions of the American Philosoph. Society, n.s. 64.4, Philadelphia, 1974, give an English translation and provide facsimiles of the two mss., the one from Schlettstadt/Sélestat (10th cent.) and the one used for the first edition by Sir Thomas Phillipps (12th cent.; now in the Corning Museum of Glass at Corning, New York). Both are described in Smith and Hawthorne, pp. 4-7. Section 282 quoted here is only in the Phillipps ms. Phillipps' original publication is available at <<http://reader.digitale-sammlungen.de/resolve/display/bsb10800422.html>>.

²² Transl. Smith and Hawthorne, 71. See their Note on the translation, p. 14.

²³ Dietlinde Goltz, *Studien zur Geschichte der Mineralnamen in Pharmazie, Chemie und Medizin von den Anfängen bis Paracelsus*, Wiesbaden, Steiner, 1972 (Sudhoffs Archiv. Beiheft 14), p. 170, says that *nitrum* in Antiquity was a carbonate of alkali, like sodium carbonate; similarly Robert Halleux, *Les alchimistes grecs*, t. 1, Paris, Les Belles Lettres, 1981, p. 223 'carbonate et bicarbonate de sodium.'

opinion be useful for steeping the grains. Thus I suggest translating the passage as follows:

282. Starch

Starch is the inner part of wheat. Half a pound (of wheat) mixed in 5 oz. of warm water and half an ounce of soda and sufficient water.

Smith and Hawthorne's translation 'Starch paste' is wrong, since a paste, containing liquid, would turn sour, as the authorities quoted earlier said. I do not understand why water is mentioned twice in 282, first 5 oz. and then 'sufficient' water, nothing being said at all about the water being changed.

Some vocabulary of Galen. *alfab.* 6

acror for the more classical *acor* (which is preferred by **O**, hardly transmitted in his model) is rare but attested in Late Antiquity (cf. *TLL* s.vv.); **P** replaces it with *acredo*. Since both *sportula* and *sportella* are possible (Pliny used *sporta*²⁴), we cannot be sure which form was used by the author. One ms. has *perculcatur* instead of *percolatur* or *colatur*; *perculcatur* is certainly the *lectio difficilior*, but the shade of meaning that would stress the application of force as opposed to dripping is compounded by the phonetic resemblance of the two words. Partly out of despair I introduced a word I have not seen attested elsewhere, *situosus*, derived from *situs*, *ūs*, which could mean 'mould' or 'must' (as in musty), into the phrase *sine situoso aliquo aut inquinoso odore*, i.e. the starch to be selected should have no musty or foul smell²⁵ whatsoever. *REW* 7963 gives *seto* 'foul smell' as an Old Italian successor of *situs*.

Inquinosus: the *Thesaurus* is doubtful about the only instance on its files, Colum. 12.55.1 *minus unguinosam* (†*incynosam*† Rodgers) *et magis durabilem salsuram facit. unguinosam* 'oily' is a conjecture by Gronovius²⁶ for the transmitted *incynosam*, which Svennung in his role as proof-reader of the *Thesaurus* (*in sche-*

²⁴ *FEW* has two articles, *sporta* (where *sportella* is also mentioned), and *sportula*. It is interesting to see that these wicker baskets were used for mashed olives, a use perhaps similar to that in the preparation of starch.

²⁵ I agree with Everett's translation, p. 149.

²⁶ I do not know which of the Gronovii – at least three philologists from the same family are known – made the conjecture.

dis) – I think, correctly – interpreted as *inquinus*; he would have been glad to have another example in Galen. *alfab.*, but our passage obviously had not been excerpted. Meinrad Scheller, author of the *Thesaurus* article, gave the meaning of *inquinus* as '(sanie) inquinatus, infectus'; I would suggest 'smelly',²⁷ although salting (*salsura*) should have killed off any bacteria that might cause a smell, and male pigs were regularly castrated.²⁸ There is no reason to assume that not allowing a pig to drink before it is slaughtered would reduce the fat content (*unguinosa*) of the carcass, although both the editors of Columella in the Loeb Classical Library, E. S. Forster and E. H. Heffner, and in the Tusculum Bücherei, Will Richter, opted for *unguinosa*.²⁹ Surprisingly the most recent editor of Columella, R. H. Rodgers in the OCT series (Oxonii 2010), mentions neither *unguinosa* nor *inquinosa* in his apparatus; he puts *incynosam* in *cruces* and lists some other conjectures: *uitiosa* from the 1494 edition (also adopted by J. G. Schneider), *tinea* from Pontedera,³⁰ *cariosa* (Hedberg in the *Collectio scriptorum ueterum Upsaliensis*) and a suggestion of his own, *mucosa*, also a rare word.

lacrimum as an alternative form for *lacrima* is well attested in Late Latin (cf. the *Thesaurus*); *collyria ad lacrimum facientia* are eye-medications that work (*facientia*) for an excessive secretion of tears, not 'colirios que producen lágrimas'.³¹

²⁷ Peter of Abano, in his gloss on the alphabetical Dioscorides ch. 17 *inquinoso odore* (i.e. Galen. *alfab.* 6), says 'Id est turpi vel fetido.'

²⁸ Felix Saubehr, *Schwein gehabt!*, Streifzüge in der säuischen Vor- und Frühgeschichte, Kobenhofen, MKS Press, 2014, p. 209.

²⁹ I benefitted from discussing the problem with Dr. med. vet. Horst Kröll of Erfurt, Germany, who qualified as a butcher before studying veterinary medicine.

³⁰ *Iulii Pontederæ curae postumae ad scriptores r. r., in: Scriptorum rei rusticae ueterum Latinorum tomus quarti pars posterior seu tertia ... collegit, auxit et emendauit Io. Gottlob Schneider, Saxo, Lipsiae 1796, p. 69 says: 'P. 622. Cap. LVII. vitiosa] Ienson. Polit. incinnosa, Caesen. incinosa, in suo Pontedera legit in cinosa, unde tineis obnoxiam efficiebat vir doctus.'*

 Cat. 162.3 in the app. of Rodgers refers to Cato *agr.*

³¹ José Manuel Cañas Reillo, translating this passage in ms. L, in: *Herbolarium et materia medica* (ms. 296). *Libro de estudios. Ensayos de ... Transcripción y traducción del texto del manuscrito por J. M. C. R., AyN Ediciones, s. l., 2007, p. 390. Cf. Marcell. med. 8.6 ad epiforas, quae cum tenui et acri lacrima exsistunt. It contains an amount of amuli recentis et dulcissimi.*

Starch in sources from the high Middle Ages

The next relevant text is the alphabetical version of Dioscorides,³² sometimes attributed *faute de mieux* to Constantine the African (d. 1087). It would, however, make sense to see a connection between this compilation and the School of Salerno, and to assume a tentative date of between 1050 and 1150, since our oldest mss. date from the 12th century. The Alphabetical Dioscorides draws on multiple sources,³³ not all of which have been so far identified with certainty; for the Latin text we still rely on the 1478 Colle edition³⁴ (abbreviated Dyasc. in *Mittelateinisches Wörterbuch*). Excerpts from Galen. *alfab.* are included in Ch. 17 of Dyasc., based on the Latin Dioscorides 2.101 (p. 212 Stadler). The compilation technique used in it interlaces paragraphs or snippets, which makes it harder to identify them than if sources appear in sequence. Names of authors are never given, a practice common in later Salernitan compilations, and I take this as an additional argument for an earlier date.³⁵

A work that does give the names of individual authors or sources was compiled in the early fourteenth century (i.e. not much after Simon of Genoa's *Clavis sanationis*,³⁶ similar but different) by Matthaeus Silvaticus, perhaps a Salernitan doctor. The title

³² See John M. Riddle, b. Latin Alphabetical Dioscorides Redaction, part of his article "Dioscorides" in: *Catalogus translationum et commentariorum: Mediaeval and Renaissance Latin translations and commentaries*, Editor in Chief F. Edward Cranz, Associate Editor Paul Oskar Kristeller, Washington D. C., The Catholic University of America Press, 1980, pp. 1-143, at pp. 23-27, with a list of mss.

³³ See Riddle, p. 24.

³⁴ A digitized ms. is Cologny, Fondation Bodmer, 58 (e-codices.ch), others are mentioned by Marie Cronier, "Le Dioscoride alphabétique latin et les traductions latines du *De materia medica*", in: *Body, Disease and Treatment in a Changing World. Latin texts and contexts in ancient and medieval medicine*, ed. by David Langslow and Brigitte Maire, Lausanne, Éditions BHMS, 2010, pp. 189-200, whose main aim is showing "that some new fragments of translation-B [of Dioscorides] can be found in the Latin alphabetical version of *De materia medica*."

³⁵ Vincentius Bellovacensis, *Speculum naturale* 11.55 (I used the reprint of the 1624 Douai edition), begins with a section from Dioscorides, Dyasc. in this case, as the interpolations from Galen. *alfab.* that occur in the same places as in the Colle printing show. Vinc. Bellov. nat. 11.56 continues with excerpts from Platearius = *Circa instans* and Isaac, *diaet. partic.*

³⁶ Quotations are from the online version at <www.simonofgenoa.org>.

of his work³⁷ – or at least one title, seeing that there is no critical edition, nor even a study, since Meyer's account in volume 4 of his 1857 *History of Botany*³⁸ – is *Pandectae*, which sounds rather like a Greek version of Razi's title *Continens*, meaning 'containing everything.' Matthaeus Silvaticus uses two formats: short entries, providing succinct explanations of words, many Arabic; and longer (numbered) chapters on *simplicia*³⁹. Among them is one on *amilum*, which I reproduce from the Bologna 1474 edition (introducing line breaks and numbering for easier reference):

1. Amilum uel apoyoy gre. (ἄποιος) ara. uisce: latine uero amidum
2. Amidum uel amilum est sucus frumenti & dicitur amilum ab a quod est sine et melos grece id est mola eo quod sine⁴⁰ mola fit
3. Vnde amilum est medulla frumenti quod infunditur & tonditur donec furfur suum dimittat: deinde cum aqua mittitur in sportulam & cum pressura colatur & cum in uno⁴¹ uase uelut fex residerit aqua effusa in sole siccatur post hoc leuiter stringatur.
4. Cassius felix cap. de amilo.
Amilum temperate caliditatis est: et hu. quod sic fit frumentum in aqua frigida ponatur per diem et noctem: et de die in diem aqua remoueatur⁴² quousque frumentum uideatur putrefieri: deinde aqua remota optime teratur: et cum eadem aqua optime confectum per

³⁷ A fuller one is *Incipit liber cibalis et medicinalis pandectarum Mathei Silvatici medici de Salerno et gloriosissimo Roberto regi Siciliae inscriptus*, printed Neapoli, 1 April 1474.

³⁸ Ernst H. F. Meyer, *Geschichte der Botanik*, vol. 4, Königsberg 1857, pp. 167-177. He recommends using the Naples 1474 edition, Hain 15194; the Bologna 1474 edition, GW M42128 = Hain 15195 is digitized at Bayerische Staatsbibliothek München.

³⁹ Meyer 4, p. 171: 'Es besteht aus 724 durchlaufend numerirten längern Kapiteln und zahlreichen meist kurzen Worterklärungen ohne Nummer, beides untereinander auf eigenthümliche Weise alphabetisch geordnet, ...'

⁴⁰ Correct Willem F. Daems, *Nomina simplicium medicinarum ex synonymariis mediæ aevi collecta*: semantische Untersuchungen zum Fachwortschatz hoch- und spätmittelalterlicher Drogenkunde, Leiden, Brill, 1993, p. 114 *Amidum farina fine(!) mola*.

⁴¹ Recte: *imo*. (*in fundo uasis* says, unmistakably, the *Commentarium* in vol. 5 of the *Collectio Salernitana*, below, n. 55).

⁴² This must be a mistake (here and below) for *renouatur* or *renouetur* in the source of this passage, the *Circa instans*.

pannum exprimatur et soli exponatur ut exsiccet usque ad aque consumptionem et frequenter remouetur aqua frigida donec dealbetur quod residet desiccatur & induratur.

5. SERA. li. agre.⁴³ cap. de amilo

Amilum infrigidat & desiccatur plus quam frumentum.

6. Et melius ex eo est illud quod fit in estate: & modus operationis eius est ut accipias [de] frumentum et ipsum bene purges & infundes in aqua dulci: & laues ipsum cum ea: et post proice aquam illam cum qua ipsum lauasti: et funde super ipsum aquam aliam et facies ita quinquies in die et si potes in nocte similiter et quando mollificatur oportet quod eiicias aquam eius cum facilitate sine agitatione aliqua ne cum aqua egrediatur aliquid de lacte.

7. Et postquam hoc feceris calca cum pedibus et proice ipsam aquam: et quod supernatauerit super aquam ex furfure collige cum caccia⁴⁴ perforata et abice residuum postquam uero purgatum fuerit a furfure et colatum pone super latere<s> nouos et expone soli calido

8. et si remanserit in eo aliqua humiditas pone super ignem.

9. Et sapor eius est acetosus et uirtus eius est pauca caliditatis:

10. sed est conpositum ex uirtutibus contrariis. Nam una est frigida propter acetositatem que est in eo et alia calida a caliditate eius que est in farina que est in eo a calore putrefaciente.

11. Gal. primo de cibis.

Amilum habet uirtutem lenitiuam exasperatorum existit autem commune huiusmodi opus omnibus substantiis quecumque sicce secundum consistentiam existentes neque stipticitatem habent neque <pungitiuitatem neque>⁴⁵ aliquam aliam qualitatem manifestam: uel uirtutem et uocant ipsum apoyoyos id est sine qualitate merito existentem talem⁴⁶ ut ad sensum est <et>⁴⁷ in humidis substantiis a[li]qua talis:

⁴³ li. agre. = *liber aggregatoris*.

⁴⁴ R. E. Latham, *Revised medieval Latin word-list from British and Irish sources*, London, British Academy, 1965: 'cacia] small colander'.

⁴⁵ *add.* 1490 (1490 = *Galieni opera* ed. Bonardo, Venetiis 1490, = GW 10481; the translator of Gal. *alim. fac.* is William of Moerbeke).

⁴⁶ existentes tales *clm* 30.

⁴⁷ *add.* *clm* 30.

12. consimile autem est uirtute ablutis panibus minus tamen alimentum dans co<r>pori. <quam abluti panes: hic et non calefaciens sicut neque illi aliis panibus calefacientibus. Hiis quidem enim qui ex aqua decoctis frumentis: neque comperari ipsum oportet. Calefaciuntque palam: et nutriunt fortiter si digerantur. cum tamen sint difficulter digestibiles vt dictum est.>⁴⁸

13. DYAS. capitulo de amilo.

Amilum appellatum est ab eo quod greci milos molam uocant id est quod sine mola fiat. Est autem utilius amilum quod ex tritico fit cretico aut egipceo Accipe triticum et laua in aqua bona infunde et muta ei aquam limpidam quinquies in die ut diligentius fiat: et nocte mutabis ei aquam: et liqua quando molle fit et manibus confrica et adde aquam postquam confricaueris et liquaueris: pone ad solem colatum⁴⁹ sed non multam habeat aquam cum liquas.

14. Est autem optimum amilum recens et candidum et lene sine ulla acrore et inquinoso odore.

15. POSSE.⁵⁰ DYAS. amilum facit ad abstinendum reuma oculorum: alta uulnera oculis replet: aspredinem oculorum tollit sanguinem reicientibus bibitum singulare presidium est Aspredines arteriarum dislenit. Iussello lactis miscetur:

16. et profluu<i>um uentris stringit ualde: potest autem leniter stringere propter quod in colliriis lacrimas stringentibus miscetur

17. ualet similiter contra apostemata spiritualium et tussim coctum in aqua ordeï cum lacte amigdalarum additis penidis.⁵¹

⁴⁸ add. 1490.

⁴⁹ The error *colatum* instead of *caloratum* (Stadler, ἐν ἡλίῳ ὀξυτάτῳ) tells us that Dyasc. and not Diosc. is the source here. Vincent. Bellovac. *spec. nat.* 11.55 also has *colatum*.

⁵⁰ 'power', i.e. what the simple can do.

⁵¹ Cf. Latham s.v. *penidii*, according to whom there is an English word penide, var. pennet, French pénide, a preparation of sugar, at later times, barley-sugar; cf. Hans Wölfel, *Das Arzneidrogenbuch Circa instans in einer Fassung des XIII. Jahrhunderts aus der Universitätsbibliothek Erlangen. Text und Kommentar als Beitrag zur Pflanzen- und Drogenkunde des Mittelalters*, Diss. math.-nat. Berlin, 1939 (based on one ms.), p. 94. Bartholomaeus Castelli, *Lexicon medicum Graeco-Latinum Bartholomaei Castelli novissime retractatum et auctum ab Hieronymo Fiorati et aliis celeberrimis Patavinis scriptoribus*, Venetiis, typis Modesti Fentii, 1795, t. 2 p. 211 '*Penidium est epitheton Sacchari clarificati, purificati et in bacillos redacti.*' Cf. further Avicenna, *Canon* 2.2.557.

18. SERA. Amilum confert humoribus currentibus ad oculos et ulceribus que dicuntur felfeoles⁵² et quando bibitur abscindit⁵³ sanguinem qui uenit a pectore et lenit asperitatem gutturis et quando miscetur cum lacte aliquo cibo hoc idem facit.

Matthaeus Silvaticus mentions four authors by name, in order of appearance Cassius Felix, Serapion, Galen, and Dioscorides. Serapion, author of an extremely popular work on simples, is well known to historians of pharmacy and medicine, but not to classicists or medievalists. Serapion combines excerpts from Galen and Dioscorides and thus, strictly speaking, need not be dealt with here in extenso; some remarks will follow in an excursus later. Serapion cites his sources in the same way Matthaeus Silvaticus does, i.e. giving the author's name at the start of a quote. In the following table, they appear under the heading 'source declared,' Dyasc. is the Latin Alphabetical Dioscorides, which in its Ch. 17 combines the early Latin translation printed by Stadler, and Galen. *alfab.* It is intriguing to see that § 3 in Matthaeus Silvaticus comes from Galen. *alfab.*,⁵⁴ but in this case not via Dyasc., because for the preparation of *amylum*, Dyasc. copies the Latin Dioscorides (as in Stadler). Since the method of preparing *amylum* would be duplicated in Dyasc. if both. Diosc. and Galen. *alfab.* appeared side by side, it is unlikely that the absence of this part of Galen. *alfab.* in Dyasc. is an accident of transmission. In contrast, Matthaeus

⁵² *felfeches* British Library, Harley 3745, fol. 12^{rb}, 14th century, first quarter (online), and the *editio princeps* of Serapion (Milan 1473, GW M41685, digitized at Bayerische Staatsbibliothek München; *flfrs* the Arabic ms. G-II-9 at El Escorial used by Aguirre de Cácer, p. 134), φλύκταις Wellmann in his text, φλυκταίνας v. 1., obviously badly distorted in the Arabic, as my colleague Ivan Garofalo informs me. (It would be interesting to ascertain which Arabic translation of Dioscorides Ibn Wāfid used.) Meyer, *Geschichte der Botanik*, vol. 3, Königsberg, 1856, p. 235 recommends this edition whose full title is: *In hoc volumine continentur insignium medicorum: Ioan. Serapionis Arabis De simplicibus medicinis opus praeclarum & ingens, Averrois Arabis, De eisdem liber eximius, Rasis filii Zachariae, de eisdem opusculum perutile, incerti item auctoris de centaureo libellus hactenus Galeno inscriptus, dictionum arabicarum iuxta atque latinarum index valde necessarius, in quorum emendata excusione, ne quid omnino disyderaretur Othonis Brunfelsii singulari fide & diligentia cautum est*, Argentorati 1531, available from botanicus.org.

⁵³ = *abscidit*.

⁵⁴ Not mentioned in Keil's article on Matthaeus Silvaticus in *Lexikon des Mittelalters*.

Silvaticus gives us everything he had access to, and this included here Galen. *alfab.* and Dioscorides' method of preparing *amylum* both in the old Latin translation edited by Stadler (and found in Dyasc.) and also in Serapion's version of Dioscorides (Greek-Arabic-Latin).⁵⁵

Sources of Matthaeus Silvaticus on *amilum*

section	source	source declared
1	Gal. <i>alim. fac.</i> 1.8.1 6.500.9-10 Kühn (translated by William of Moerbeke)	
2	Dyasc. 17; Diosc. <i>mat. med.</i> 2.101.1 p. 212 Stadler	
3	Galen. <i>alfab.</i> 6 (<u>not</u> in Dyasc.)	
4	<i>Circa instans</i> p. 9 Wölfel (<i>Tractatus de herbis</i> 12)*	Cassius Felix
5	Serapion quoting Gal. <i>simpl.</i> 8.16.42 12.111.5-7 Kühn	SERA.

⁵⁵ For good measure, I add from the *Commentarium Magistri Bernardi Provincialis super Tabulas Salerni*, in Salvatore de Renzi (ed.), *Collectio Salernitana*, vol. 5, Napoli, 1859, p. 311: *Fit autem sic* (sc. *amilum*): *frumentum ponatur in aqua et cotidie aqua bis uel ter mutetur. Frumentum debet prius aliquantulum concassari et expaleari acsi deberet comedi. Postea cola per mandile* [piece of cloth, see REW 5325, Classical Latin *mantele*] *et aquam prohice et quod remanebit in fundo uasis erit amidum*. Simon of Genoa: *Amilum est succus frumenti in aqua diu macerati colatus et desicatus D. dicitur sic ab a. quod est sine et milos* (μύλος) *mola eo quod sine mola fiat, nam .g. milos mola dicunt*.

* Iolanda Ventura, *Ps. Bartholomaeus Mini de Senis, Tractatus de herbis* (Ms London, British Library, Egerton 747), Firenze, SISMEL Edizioni del Galluzzo, 2009 (Edizione nazionale «La Scuola medica salernitana». 5), pp. 23ff. on the diffusion of the *Circa instans* (more than 190 mss.). Dr. Ventura is currently engaged in preparing a critical edition of the *Circa instans* in Latin. Gundolf Keil's article on the *Circa instans* in *Lexikon des Mittelalters* (online at Brepolis) should be used with caution. The same applies to his articles on Rufinus Botanista (a word I have not seen in medieval Latin [unlike *botanicus*, which is at least attested in the 17th century]; it refers to the author of The Herbal of Rufinus) and Matthaeus Silvaticus. (It is disappointing to see that Rudolf Schmitz, *Geschichte der Pharmazie*, Band 1: Von den Anfängen bis zum Ausgang des Mittelalters, Eschborn, 1998, pp. 387-388, just copies the *Lexikon des Mittelalters* without acknowledgement. Or is it perhaps the other way round?)

section	source	source declared
6–7	Serapion quoting Diosc. <i>mat. med.</i> 2.101.1**	SERA.
8	unidentified	
9	unidentified	
10	unidentified***	
11	Gal. <i>alim. fac.</i> 1.8.1 6.500.6–11 Kühn	Gal. primo de cibis
12	Gal. <i>alim. fac.</i> 1.8.2 6.500.11–18 Kühn	
13	Dyasc. 17; Diosc. <i>mat. med.</i> 2.101.1 p. 212 Stadler	DYAS.
14	Dyasc. 17; Galen. <i>alfab.</i> 6	
15	Dyasc. 17; Diosc. <i>mat. med.</i> 2.101.1 p. 212 Stadler	DYAS.
16	Dyasc. 17; Galen. <i>alfab.</i> 6	
17	<i>Circa instans</i> p. 9 Wölfel (<i>Tractatus de herbis</i> 12)	
18	Serapion quoting Diosc. <i>mat. med.</i> 2.101.2	SERA.

It is even stranger that the text taken from the *Circa instans*⁵⁶ is here ascribed to Cassius Felix. Was there a manuscript where the text of Cassius Felix as we know it, or the spurious *Antidotarium*⁵⁷ (perhaps identical with the *De unguentis* in two mss.), preceded the *Circa instans*? Rose had remarked on this,⁵⁸ citing Matthaeus Silvaticus' chapter on *petroleum*, but Fraisse, the last editor of Cassius Felix, does not even mention the problem. Obviously,

** Meyer, vol. 3, p. 237: 'Sogar den Dioscorides benutzte er ... in der arabischen Uebersetzung. ('des Stephanos Basiliou [Iṣṭafān ibn Bāsīl], says Keil, on Matthaeus Silvaticus, in *Lexikon des Mittelalters*'. See also Meyer *ibid.*, p. 239.

*** Cf., however, Salvatore de Renzi, *Collectio Salernitana*, vol. 5, p. 310: *Amidum frigidum est in primo gradu quamuis sit medulla frumenti quod est calidum. Ex aqua enim contrahit proprietatem in frigidandi*, repeated by Rufinus p. 21 (already quoted above).

⁵⁶ Vincent. Bellovac. *spec. nat.* 11.56 gives as the author's name 'Platearius', the more usual way of referring to the *Circa instans* in the Middle Ages.

⁵⁷ Cf. V. Rose, *Cassii Felicis de medicina*, Lipsiae, in aedibus B. G. Teubneri 1879, p. 219; Anne Fraisse, *Cassius Felix. De la médecine*. Texte établi, traduit et annoté par A. F., Paris, Les Belles Lettres, 2001, pp. LXXVII–LXXIX.

⁵⁸ Rose, p. 222.

there is much work left for those continuing where our 19th-century predecessors stopped.

Excursus on Ibn Wāfīd alias Serapion Iunior⁵⁹

One of the first medical books to appear in print was the *Liber Serapionis aggregatus in medicinis simplicibus. Translatio Symonis Ianuensis interprete Abraam iudeo tortuosiensi de arabico in latinum*, completed in Milan by Antonius Zarotus on the 4th of August, 1473 (GW M41685).⁶⁰ This is a clear testimony of its importance in the eyes of contemporary doctors, borne out by a number of reprints over the following eighty years. The author's name, Serapion, was a puzzle, especially when an identification with Yohannān bar Serābyōn (Yūhannā ibn Sarābiyūn in Arabic), a 9th-century author who wrote in Syriac,⁶¹ proved impossible, and calling him Serapion the Younger or, as the influential German historian of pharmacy Wolfgang Schneider suggested,⁶² Pseudo-Serapion, did not solve the problem of identification. Although it was obvious that the work had indeed been translated from the Arabic, no Arabic manuscripts were known. In his review of the first edition of the Arabic text with a translation into Castilian by Luisa Fernanda Aguirre de Cárcer,

⁵⁹ Cf. Meyer, vol. 3, pp. 234-239, an item surprisingly absent from the bibliography of Gundolf Keil's "Serapion junior" in *Lexikon des Mittelalters*. (Keil's articles on these authors in *Die deutsche Literatur des Mittelalters. Verfasserlexikon*, 2. Auflage, [also available online from the publisher, de Gruyter] are basically the same as his entries in *Lexikon des Mittelalters*.)

⁶⁰ The pseudo-Galenic *De uirtute centaureae* follows on ff. 185^{rb}-187^{vb}, cf. Vivian Nutton, "De uirtutibus centaureae: A pseudo-Galenic text on pharmacology", *Galenos* 8 (2014), pp. 149-175, at pp. 151f. As Nutton states, this happened to be the first medical text from Antiquity ever to be printed.

⁶¹ Cf. Manfred Ullmann, *Die Medizin im Islam*, Leiden/Köln, Brill, 1970 (Handbuch der Orientalistik. 1. Abt., Ergänzungsband VI, 1. Abschnitt), pp. 102f., and Peter Pormann, "Yūhannā ibn Sarābiyūn: Further studies into the transmission of his works", *Arabic Sciences and Philosophy* 14 (2004), pp. 233-262. On p. 237, Pormann prints the Arabic text (presumably taken from Aguirre de Cárcer's edition) of the first sentences of the introduction with the Latin translation as found in the Venice 1479 printing. In l. 9 Pormann, the *editio princeps* has additional text: (*qualitate*) *seu complexione sua (et uirtute)*.

⁶² Wolfgang Schneider, s.v. "Serapion, Johannes", in: Wolfgang Schneider, *Geschichte der Pharmazie*, Stuttgart, Wissenschaftliche Verlagsgesellschaft, 1985, p. 251 (Wörterbuch der Pharmazie 4). He served his apprenticeship at the Fichtenberg-Apotheke in Berlin Steglitz.

Madrid, 1995,⁶³ Juan Carlos Villaverde Amieva made clear that the *Liber in medicinis simplicibus* was nothing but the Latin translation of the *Kitāb al-Adwiya al-mufrada* of Ibn Wāfid⁶⁴ from Toledo (999-1075⁶⁵). Aguirre de Cárcer had had access to only one manuscript, G-II-9 in the Escorial; there, the Arabic text is written in Hebrew characters (converted into Arabic in her edition).

An obvious drawback of the manuscript in the Escorial is that it lacks about half of the entries on individual items of *materia medica* (226 of some 450⁶⁶). Since Aguirre de Cárcer had not been aware of the existence of a Latin translation,⁶⁷ she did not compare it with her Arabic text.⁶⁸ Villaverde Amieva wrote,⁶⁹ some thir-

⁶³ Juan Carlos Villaverde Amieva, "El "Libro de medicamentos simples" del toledano Ibn Wafid y sus versiones arabe, hebrea, latina y romances: hacia una edición plurilingüe", *ḡulayṭula: Revista de la Asociación de Amigos del Toledo Islámico*, N°. 10 (2002), pp. 87-91. There is also a more recent edition of the Arabic text by Aḥmad Ḥasan Basaḡ, Beirut 2000, (cf. Pormann, p. 237 n. 17) which I have not seen, but it is listed in the OPAC of Bayerische Staatsbibliothek at Munich (not mentioned in Villaverde Amieva, *Diccionario*, p. 269). As Villaverde Amieva informs me by e-mail (7 August, 2015), the Arabic text there is just pirated from the edition of Aguirre de Cárcer.

⁶⁴ On him, see Ullmann, *Medizin*, pp. 273 and 210, and the introduction in Aguirre de Cárcer's edition.

⁶⁵ Luisa Fernanda Aguirre de Cárcer discusses the conflicting dates for his birth and death in *Ibn Wāfid (m. 460/1067), Kitāb al-Adwiya al-mufrada (Libro de los medicamentos simples)*, vol. 1, Edición, traducción, notas y glosarios [very useful], Madrid, Consejo Superior de Investigaciones Científicas, 1995 (Fuentes árabe-hispanas. 11), pp. 21f. Villaverde Amieva's review was published in *Aljamia* 9 (1997), pp. 111-118, online at <<http://www.arabicaetromanica.com/aljamia-2/vol-9-1997/>>. The dates of the author's birth and death given above were taken from Juan Carlos Villaverde Amieva, s.v. Abū l-Muṭarrif 'Abd al-Rahmān b. Muḥammad b. 'Abd al-Kabīr b. Yahyā b. Wāfid b. Muḥammad, *Diccionario biográfico español*, vol. 1, Abad-Aguirre y Viana, Madrid, Real Academia de la Historia, 2009, pp. 266-270 (with a full bibliography). He very kindly supplied both articles on my request. In 2013, the last, 50th, volume of the *Diccionario* was published; it deserves to be better known outside Spain.

⁶⁶ Aguirre de Cárcer, p. 30. The last, incomplete entry is on red currant (*grosella*), p. 354. The 1473 *editio princeps* continues (f. 150^{ra}), after the fifth book on plants, with stones and minerals; later (f. 166^{vb}), animals follow. Vat. Palat. Lat. 1109 has chapter numbers added by a later hand, ending with 459 on fol. 84^{rb}.

⁶⁷ For the first (general) part, there is also a Latin translation by Gerard of Cremona, see below.

⁶⁸ Villaverde Amieva, review, compares the beginning of the preface in Arabic with the Latin and the translation into Catalan (pp. 114f.) and part of the chapter on 'alfalfa' (86, pp. 204ff. Aguirre de Cárcer, coming from Iṣḥāq b. Imrān) in Arabic, Latin, Catalan and two Italian translations (pp. 116f.).

⁶⁹ Villaverde Amieva, review, p. 90.

teen years ago, that Rebeca Orihuela Sancho had been working for a number of years on an edition of the Latin Serapion, of which I, however, have not been able to find traces. He also stated that the first section of Ibn Wāfid on simple drugs⁷⁰ had been translated by Gerard of Cremona more than a hundred years before Simon of Genoa and Abraham of Tortosa and was printed several times as *Liber albengnefit*⁷¹ *philosophi de uirtutibus medicinarum et ciborum, translatus a Magistro Gerardo Cremonensi de Arabico in latinum*; with a little effort, we can recognise Abenguaifit as rendering Ibn Wāfid. The first edition of this incomplete version was printed, as part of a volume, by Schott in Strassburg (Argentorati) in 1531.⁷² My first impression is that Albengnefit and Serapion differ considerably, and I am surprised that Villaverde Amieva, who examined the preface,⁷³ says nothing at all about this discrepancy.

To explain the attribution to Serapion, Ullmann thought that the *Liber de simplicibus medicinis* had followed the *Practica* of the (genuine) Serapion in early printings.⁷⁴ But Vat. Palat. Lat. 1109, written in Southern France or perhaps in Italy in the 14th century, already has (f. 1^{ra}) Serapion as author: *liber serapionis aggregatus*⁷⁵ *in medicinis simplicibus ex dictis D(ioscoridis) G(alieni)*

⁷⁰ This would be pp. 47-99 of Aguirre de Cárcer's translation.

⁷¹ Cf. Ullmann, *Medizin*, p. 273 n. 7.

⁷² Digitized at <<http://gdz.sub.uni-goettingen.de/dms/load/img/?PPN=P-PN63046880X&IDDOC=577309>>, pp. 119-139>. More editions are listed in Villaverde Amieva, *Diccionario*, p. 269. Missing there is *Supplementum in secundum librum compendii secretorum medicinae Ioannis Mesues medici celeberrimi*. ... Quibus accessere, et alia consueta opuscula, quae tibi versa pagina indicat. ... Venetiis, apud Iuntas, 1581, digitized at <<http://www.mdz-nbn-resolving.de/urn/resolver.pl?urn=urn:nbn:de:bsb:12-bsb10147991-9>>. Albengnefit starts on fol. 264^v = scan 542. It seems likely that more printings will be identified over time, because cataloguing of Latin books, especially if they contain a number of shorter works by several authors, is often poor and unreliable. Contrast Richard J. Durling, *A Catalogue of Sixteenth-Century Printed Books in the National Library of Medicine*, Bethesda, Maryland, U.S. Department of Health, Education, and Welfare. Public Health Service, 1967, s.v. 'Abd al-Rahmān Ibn Muḥammad, called Ibn Wāfid, p. 3; although it deals, strictly speaking, only with the holdings of the National Library of Medicine in or before 1967, its importance for bibliographic research has not diminished almost half a century later in the age of the internet.

⁷³ Villaverde Amieva, review, pp. 114f.

⁷⁴ Ullmann, *Medizin*, p. 283.

⁷⁵ I do not see why the title is given as *Liber aggregationum* in the record of the digitized manuscript available online at <http://digi.ub.uni-heidelberg.de/diglit/bav_pal_lat_1109/0009?sid=d046b33d73b007ad95c666da4fd781b0>.

et aliorum translatio symonis ianuensis interprete abraham iudeo tortuosiensi de arab. in latinum. In the 1473 *editio princeps*, Serapion is again the first item of the lot. And in his preface of the *Clavis sanationis* (§ 4 of the online edition⁷⁶), Simon of Genoa cites, as one of his sources, *Serapionem de simplicibus medicinis*. Even more puzzling is the fact mentioned by Villaverde Amieva that a certain passage is attributed to Ibn Sarābiyūn in the Arabic (and also in the Tuscan translation), but to Abenguefit (i.e. Ibn Wāfid) in the Latin, and to *uno autore* in the Venetian version.⁷⁷

FISCHER, Klaus-Dietrich, «Starch and the *Alphabet of Galen*», *SPhV* 17 (2015), pp. 113-138.

ABSTRACT

The focus of my paper is the chapter on starch (*amylum*) in N. Everett's recent edition of the *Alphabet of Galen* (Galen. *alfab.*), an important but hitherto neglected work from late antiquity featuring some three hundred pharmaceuticals. While discussing the Latin text of this chapter and some of the problems of Everett's editorial approach, other accounts of the preparation of starch in ancient and medieval sources will be considered, shedding some light on e.g. the alphabetical version of Dioscorides and the pharmaceutical dictionary of Matthaeus Silvaticus (14th century). Matthaeus Silvaticus excerpted material from, among others, the Arabic writer Serapion, recently identified with Ibn Wāfid; this is outlined in an appendix.

KEYWORDS: starch (*amylum*), The Alphabet of (Ps.)Galen, Ps.Serapion (Serapion Iunior, *Liber aggregatoris*), Matthaeus Silvaticus (*Pandectae*), Dyascorides (*Dioscorides alphabeticus*).

RESUMEN

El tema de mi artículo es el capítulo sobre el almidón (*amylum*) en la reciente edición de N. Everett del *Alphabet of Galen* (Galen.

⁷⁶ <www.simonofgenoa.org>.

⁷⁷ Villaverde Amieva, review, p. 118.

alfab.), una importante pero hasta ahora descuidada obra de la Antigüedad Tardía que ofrece unas trescientas sustancias medicinales. Al tratar el texto latino de este capítulo y algunos de los problemas de la propuesta de edición de Everett, se tendrán en cuenta otros relatos de la preparación del almidón en fuentes antiguas y medievales, arrojando algo de luz sobre por ejemplo la versión alfabética de Dioscórides y el diccionario farmacéutico de Mateo Silvático (s. XIV). Mateo Silvático extractó material de, entre otros, el escritor árabe Serapión, recientemente identificado con Ibn Wāfid; esto es esbozado en un apéndice.

PALABRAS CLAVE: almidón (*amylum*), *Alphabetum Galeni*, Ps. Serapion (Serapion Iunior, *Liber aggregatoris*), Matthaeus Silvaticus (*Pandectae*), Dyascorides (*Dioscorides alphabeticus*).